CLAIMS

I claim:

1 1.   A method for synchronizing an elementary audio stream with an elementary video

2 stream, the video stream having a plurality of markers containing information for displaying

3 frames associated with the video stream, the method comprising the steps of:

4   sampling the markers in the video stream to obtain a time stamp and a memory stamp for

5 each marker, the time stamp indicating a time position of the marker in the video stream, the

6 memory stamp indicating a relative byte location for the marker in the video stream;

7   storing values of the time stamp and the memory stamp for each marker;

8   finding a video byte location in the video stream for a selected time position by reviewing

9 stored values of the time stamps and memory stamps;

10   finding an audio byte location in the audio stream for the selected time position; and

11   whereby the audio and video streams are synchronized for output at the audio byte

12 location and the video byte location.

1 2.   The method according to claim 1 further comprising the step of:

2   receiving input from a user to indicate the selected time position.

1   3.   The method according to claim 1 further comprising the step of:

2   simultaneously playing the video stream and the audio stream by starting the video

3   stream at the video byte location and starting the audio stream at the audio byte location.

1   4.   The method according to claim 1 further comprising the steps of:

2   building a table with the stored values of the time stamps and the memory stamps

3   associated with each marker during an initial sampling of the video stream; and

4   storing the table such that the table can be accessed for any subsequent synchronization

5   operations involving the video stream.

5.   The method according to claim 1, wherein the elementary video stream is a variable bit

rate file.

6.   The method according to claim 1, wherein the elementary video stream is an MPEG-2

file.

1   7.   The method according to claim 1 further comprising:

2   building a GVP table with the stored values of the time stamps and the memory stamps

3   associated with each marker during an initial sampling of the video stream; and

4   storing the GVP table such that the GVP table can be accessed for any subsequent

5   synchronization operations involving the video stream; and wherein

6   the elementary video stream is an MPEG-2 file; and

7   the markers are GOP markers.

1   8.   The method according to claim 1, wherein the elementary audio stream is a constant bit

2   rate file.

1   9.   The method according to claim 1, wherein the step of finding an audio byte location in

2   the audio stream further comprises the steps of:

3   determining a total time value for the audio stream that represents an amount of time

4   required to play the entire audio stream at a selected speed;

5   determining a total bytes value for the audio stream that represents the total number of

6   bytes occupied by the audio stream; and

7   calculating the audio byte location by multiplying the total bytes value by the selected

8   time position and dividing by the total time value.

1   10.   A method for synchronizing an elementary audio stream with an MPEG-2 video stream,

2   the MPEG-2 video stream having a plurality of GOP markers, each GOP marker containing

3   information for displaying a plurality of frames associated with that GOP marker, the method

4   comprising the steps of:

5   sampling at least two of the GOP markers in the video stream to obtain a time stamp and

6   a memory stamp for each GOP marker, the time stamp indicating a time position of the GOP

7   marker in the video stream, the memory stamp indicating a relative byte location for the GOP

8   marker in the video stream;

9   storing values of the time stamp and the memory stamp for each GOP marker in a GVP

10   table;

11   finding a video byte location for a selected time position by reviewing the GVP table;

12   finding an audio byte location for the selected time position; and

13   whereby the audio and video streams are synchronized for output at the audio byte

14   location and the video byte location.

1   11.   The method according to claim 10 further comprising the step of receiving input from a

2   user to indicate the selected time position.

1   12.   The method according to claim 10 further comprising the step of:

2   simultaneously playing the video stream and the audio stream by starting the video

3   stream at the video byte location and starting the audio stream at the audio byte location.

1   13.   The method according to claim 10 further comprising the steps of:

2   building the GVP table during an initial sampling of the video stream; and

3   storing the GVP table such that the GVP table can be accessed for any subsequent

4   synchronization operations involving the video stream.

1   14.   The method according to claim 10, wherein the elementary video stream is a variable bit

2   rate file.

15.   The method according to claim 10, wherein the elementary audio stream is a constant bit

rate file.

16.   The method according to claim 10 wherein the step of finding an audio byte location

further comprises the steps of:

    determining a total time value for the audio stream that represents an amount of time

4   required to play the entire audio stream at a selected speed;

5   determining a total bytes value for the audio stream that represents the total number of

6   bytes occupied by the audio stream; and

7   calculating the audio byte location by multiplying the total bytes value by the selected

8   time position and dividing by the total time value.

1   17.   A data processing system comprising a processor and a memory unit, wherein the data

2   processing system performs the steps of:

3   sampling a plurality of markers in a video stream to obtain a time stamp and a memory

4   stamp for each marker, the time stamp indicating a time position of the marker in the video

5   stream, the memory stamp indicating a relative byte location for the marker in the video stream;

6   storing values of the time stamp and the memory stamp for each marker;

7   finding a video byte location in the video stream for a selected time position by reviewing

8   stored values of the time stamps and memory stamps;

9   finding an audio byte location in an audio stream for the selected time position; and

10   whereby the audio and video streams are synchronized for output at the audio byte

11   location and the video byte location.

18.   The data processing system according to claim 17 further comprising the step of:

        receiving input from a user to indicate the selected time position.

1   19.   The data processing system according to claim 17 further comprising the step of:

2   simultaneously playing the video stream and the audio stream by starting the video

3   stream at the video byte location and starting the audio stream at the audio byte location.

1   20.   The data processing system according to claim 17 further comprising the steps of:

2   building a table with the stored values of the time stamps and the memory stamps

3   associated with each marker during an initial sampling of the video stream; and

4   storing the table such that the table can be accessed for any subsequent synchronization

5   operations involving the video stream.

1   21.   The data processing system according to claim 17, wherein the elementary video stream

2   is a variable bit rate file.

22.   The data processing system according to claim 17, wherein the elementary video stream

is an MPEG-2 file.

1   23.   The data processing system according to claim 17 further comprising the steps of:

2   building a GVP table with the stored values of the time stamps and the memory stamps

3   associated with each marker during an initial sampling of the video stream; and

4   storing the GVP table such that the GVP table can be accessed for any subsequent

5   synchronization operations involving the video stream; and wherein

6   the elementary video stream is an MPEG-2 file; and

7   the markers are GOP markers.

1   24.   The data processing system according to claim 17, wherein the elementary audio stream

2   is a constant bit rate file.

1   25.   The data processing system according to claim 17, wherein the step of finding an audio

2   byte location in the audio stream further comprises the steps of:

3   determining a total time value for the audio stream that represents an amount of time

4   required to play the entire audio stream at a selected speed;

5   determining a total bytes value for the audio stream that represents the total number of

6   bytes occupied by the audio stream; and

7   calculating the audio byte location by multiplying the total bytes value by the selected

8   time position and dividing by the total time value.

1   26.   A software program product stored on a computer readable medium comprising:

2   instructions for sampling a plurality of markers in a video stream to obtain a time stamp

3   and a memory stamp for each marker, the time stamp indicating a time position of the marker in

4   the video stream, the memory stamp indicating a relative byte location for the marker in the

5   video stream;

6   instructions for storing values of the time stamp and the memory stamp for each marker;

7   instructions for finding a video byte location in the video stream for a selected time

8   position by reviewing stored values of the time stamps and memory stamps;

9   instructions for finding an audio byte location in an audio stream for the selected time

10   position; and

11   whereby the audio and video streams are synchronized for output at the audio byte

12   location and the video byte location.

27.   The software program product according to claim 26 further comprising:

           instructions for receiving input from a user to indicate the selected time position.

1   28.   The software program product according to claim 26 further comprising:

2   instructions for simultaneously playing the video stream and the audio stream by starting

3   the video stream at the video byte location and starting the audio stream at the audio byte

4   location.

1   29.   The software program product according to claim 26 further comprising:

2   instructions for building a table with the stored values of the time stamps and the memory

3   stamps associated with each marker during an initial sampling of the video stream; and

4   instructions for storing the table such that the table can be accessed for any subsequent

5   synchronization operations involving the video stream.

1   30.   The software program product according to claim 26, wherein the elementary video

2   stream is a variable bit rate file.

31.   The software program product according to claim 26, wherein the elementary video

stream is an MPEG-2 file.

32.   The software program product according to claim 26 further comprising:

        instructions for building a GVP table with the stored values of the time stamps and the

memory stamps associated with each marker during an initial sampling of the video stream; and

        instructions for storing the GVP table such that the GVP table can be accessed for any

5   subsequent synchronization operations involving the video stream; and wherein

6   the elementary video stream is an MPEG-2 file; and

7   the markers are GOP markers.

1   33.   The software program product according to claim 26, wherein the elementary audio

2   stream is a constant bit rate file.

1   34.   The software program product according to claim 26, wherein the instructions for finding

2   an audio byte location in the audio stream further comprise instructions for:

3   determining a total time value for the audio stream that represents an amount of time

4   required to play the entire audio stream at a selected speed;

5   determining a total bytes value for the audio stream that represents the total number of

6   bytes occupied by the audio stream; and

7   calculating the audio byte location by multiplying the total bytes value by the selected

8   time position and dividing by the total time value.